

SOME COCCIDAE FROM EASTERN ASIA.

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Through the kindness of Professor E. O. Essig, of the University of California, I have been enabled to examine a collection of COCCIDAE from Formosa, made by M. Maki and S. Inamura, and also a small amount of material from Foochow, China, collected by Mr. C. R. Kellogg. It is upon this material that the present paper is for the most part based. In addition to this, I am taking advantage of the opportunity to rectify certain errors that have been made in the identification of a few species from Japan.

The material from Formosa is especially interesting, as nothing appears to have been published concerning the Coccid fauna of that island. The majority of the species here recorded are widely-distributed forms; a few are known from Japan; and several are species that have heretofore been recorded only from India, Ceylon and Java. While the number of species dealt with is not sufficiently large to permit of any generalisation, there is at least a suggestion that the Coccid fauna of Formosa is more closely related to that of southern Asia than to that of Japan.

The types of the new species here described are in the Stanford University Collection.

Icerya seychellarum (Westw.).

On *Morus alba* and *Citrus* sp., Taihoku, Formosa.

Icerya purchasi (Maskell).

On *Citrus* sp., Taihoku, Formosa.

Pseudococcus filamentosus (Ckll.).

On *Citrus* sp., Taihoku, Formosa.

Pseudococcus comstocki (Kuwana).

On *Citrus* sp., Taihoku, Formosa. Previously recorded from Japan and the United States.

Pseudococcus virgatus (Ckll.).

On *Baphinia* sp., Ako, Formosa.

Pseudococcus citri (Risso).

On *Morus alba*, Ako, Formosa.

Antonina bambusae (Maskell).

On *Bambusa stenostachya*, Taihoku, Formosa. This is the species that has ordinarily passed under the name of *Chaetococcus bambusae*. I am entirely in accord with Green in the opinion that *Chaetococcus* cannot be maintained as distinct from *Antonina*.

Antonina crawii (Ckll.).

1902. *Eriococcus graminis* (?) Maskell; Kuwana, Proc. Calif. Acad. Sci. (3), 3: 50.

On bamboo, Taihoku, Formosa. Kuwana (ref. cited) has recorded *Eriococcus graminis*. Maskell, from Japan. I have at hand the specimens upon which the record was based and they prove to be nothing more than immature stages of an *Antonina*, without much doubt *A. crawii*.

Cerococcus ficoides (Green).

On *Mallotus japonica*, Taihoku, Formosa. Previously known only from the original record, on tea from Bengal. The excellent description and figures given by Green render the identification practically certain.

Tachardia decorella (Maskell).

On *Ficus retusa* and undetermined host, Taihoku, Formosa.

Mallococcus sinensis (Maskell).

On undetermined host, Foochow, China. I have at hand part of the type material of this species and would redescribe it here (it is hardly or not at all recognisable from the original description) were it not that another author has a redescription now in press.

Ceroplastes rubens (Sign.).

On *Citrus*, Ako, Formosa.

Coccus bicruciatus (Green).

On *Murraya exotica*, Taihoku, Formosa. Previously recorded only from Ceylon.

Coccus elongatus (Sign.).

On *Acacia confusa*, *Codiaeum variegatum*, *Gossypium herbaceum*, *Hibiscus rosa-sinensis* and *Myrica rubra*, at Taihoku, and on *Morus alba* at Ako, Formosa.

Saissetia hemisphaerica (Targ.).

On *Gardenia florida*, Taihoku, Formosa.

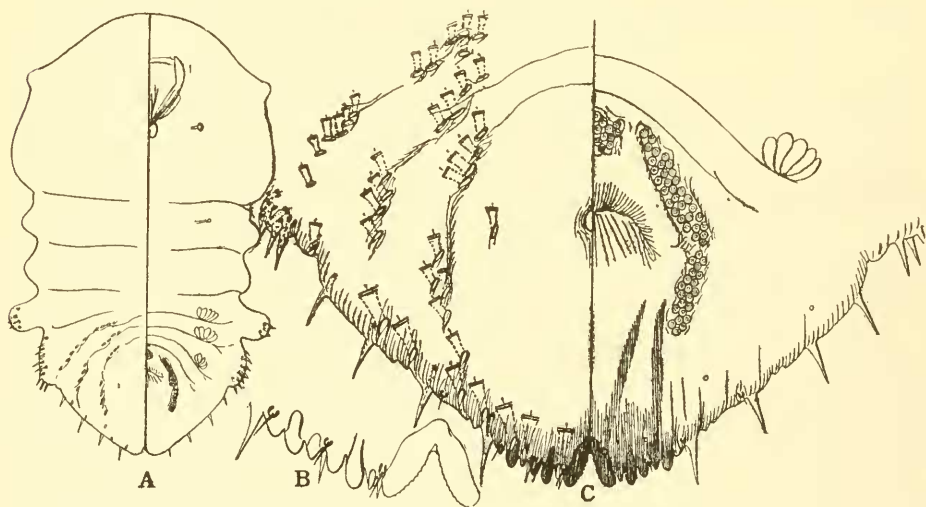


Fig. 1. *Aulacaspis cinnamomi* (Newstead): A, adult female; B, portion of pygidial margin; C, pygidium.

Aulacaspis cinnamomi (Newstead) (fig. 1).

On *Cinnamomum camphora*, Taihoku, Formosa. Previously recorded only from *Cinnamomum ceylanicum* in Java.

The specimens at hand differ somewhat from the figures given by Newstead, but these figures are not entirely clear, and in view of the close similarity in general appearance and in hosts I am inclined to assume that the figures are in error. I am presenting new figures. The species is certainly an *Aulacaspis*.

Aulacaspis rosae (Bouché).

On cultivated rose, Taihoku, Formosa.

Aulacaspis pentagona (Targ.).

On *Morus alba*, Taihoku, Formosa.

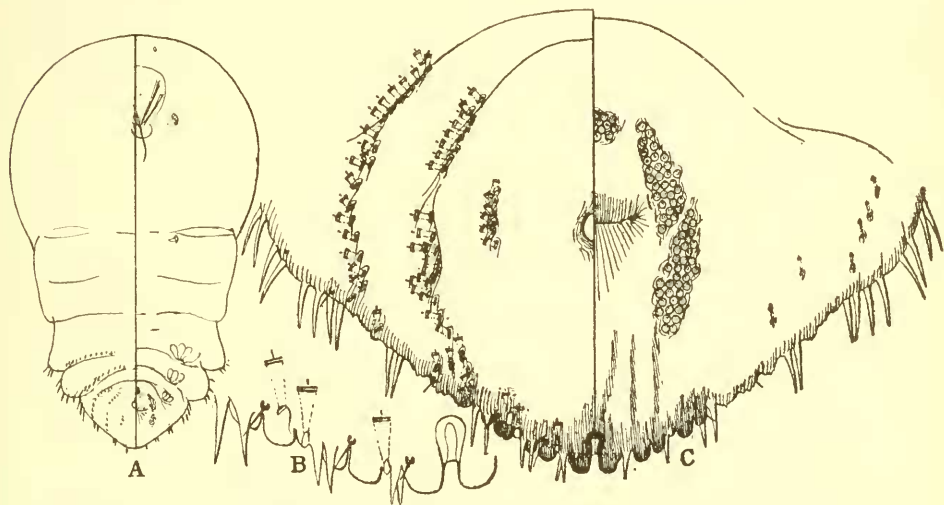


Fig. 2. *Aulacaspis tegalensis* (Zehntner): A, adult female; B, portion of pygidial margin; C, pygidium.

Aulacaspis tegalensis (Zehntner) (fig. 2).

On sugar-cane, Taihoku, Formosa. Previously recorded from Java and Mauritius. My determination is on the basis of specimens from Java.

I know of no figures of this species other than those given by Zehntner, which are in out-of-the-way publications and are in addition not especially satisfactory, and as the species is likely to be of some economic importance I am presenting new figures. I regard it as an *Aulacaspis* rather than a *Chionaspis*.

Phenacaspis eugeniae (Maskell).

On *Michelia fuscata*, Taihoku, Formosa.

The exact identity of Maskell's *Chionaspis eugeniae* appears to be in doubt, for there occurs in the Pacific region a series of forms which are very closely related. The Formosa specimens agree closely with examples from Hawaii which have been determined as *eugeniae*.

Chionaspis annandalei (Green).

On *Bambusa stenostachya*, Taihoku, Formosa. Previously known only from India.

***Pinnaspis simplex*, sp. n. (fig. 3).**

From undetermined host, Foochow, China.

Scale of the female 1.5 mm. long, elongate, narrow, dark brown. Scale of the male not observed.

Female 0.9 mm. long, of the usual elongate form, the derm membranous throughout except for the pygidium. Margins of the abdominal segments projecting but little, without gland spines or at the most with a single gland spine on the last segment anterior to the pygidium, with numerous marginal ducts. Dorsum without ducts. Anterior spiracles with a small group of pores. Pygidium (fig. 3) acutely pointed, the median lobes alone developed, apparently fused, their outer edges crenulate. Extending into the pygidium from the median lobes is a slender, elongate median thickening. Beyond the median lobes there is first a small prominence followed by two setae, one of which has a conspicuously chitinised socket, a gland spine, two submarginal pores, a seta, a submarginal pore, two gland spines and a submarginal pore. Dorsum of the pygidium without pores except for the marginal series and a single pore representing the front row. Anal opening close to the anterior margin of the pygidium. Circumgenital pores in five groups.

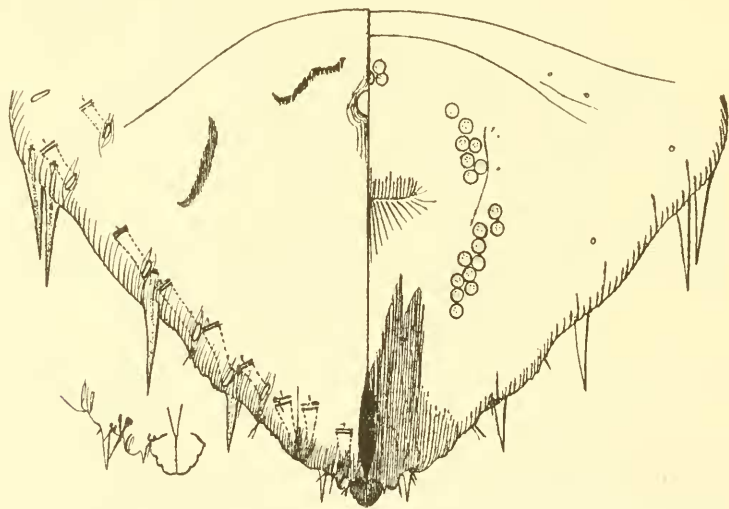


Fig. 3. *Pinnaspis simplex*, sp. n. : pygidium and portion of pygidial margin.

Notes.—Specimens of this species have been examined by Mr. E. E. Green, who agrees with me that it is undescribed. It is characterised by the single pair of lobes and is quite distinct from any other species known to me. I may note that I am considering the genera *Pinnaspis* and *Hemichionaspis* as synonymous.

***Pinnaspis minor* (Maskell).**

On undetermined host, Taihoku, Formosa.

***Parlatoria pergandei* (Ckll.).**

On palm (?), Foochow, China, and on *Thea sinensis* and undetermined host at Taihoku, Formosa.

***Parlatoria zizyphi* (Lucas).**

On *Citrus* sp., Taihoku, Formosa.

Fiorinia japonica (Kuwana) (fig. 4, C).

1902. *Fiorinia fioriniæ* var. *japonica*, Kuwana, Proc. Calif. Acad. Sci. (3), 3: 79 (part).

From *Pinus thunbergii*, Taihoku, Formosa. Originally recorded from *Pinus* sp. and *Podocarpus chinensis* in Japan, the latter record in error.

In the original description of this species as a variety of *F. fioriniæ* the type host was not designated. I find the material recorded by Kuwana to include two species and designate as a lectotype a specimen from *Pinus*. The specimens from *Podocarpus* I consider to belong to *F. juniperi*, Leonardi.

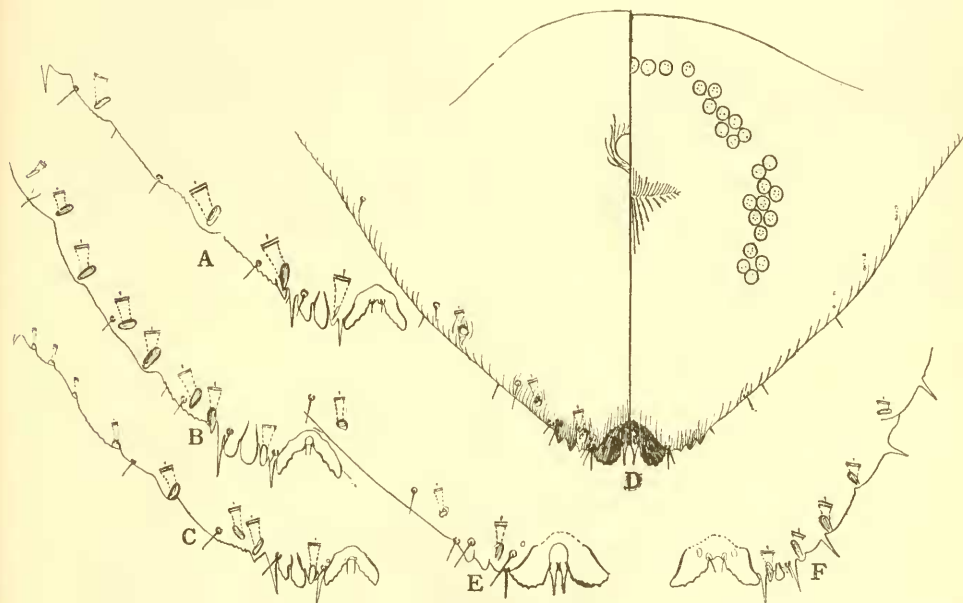


Fig. 4. Pygidial margins of : A, *Fiorinia fioriniæ* (Targ.), from palm in the United States; B, *F. juniperi*, Leonardi, from *Podocarpus chinensis* in Japan; C, *F. japonica*, Kuwana, from *Pinus* in Japan; E, *F. chinensis*, sp. n.; F, *F. chinensis*, sp. n., second stage. D, pygidium of *F. chinensis*, sp. n.

Kuwana separated this form from *F. fioriniæ* on the grounds of the larger number of circumgenital pores, but there appear to be more satisfactory characters in the number and arrangement of the marginal tubular ducts of the pygidium. In *F. fioriniæ* (fig. 4, A) there are not more than four large ducts followed by as many small ducts. Otherwise the two species are very similar.

Fiorinia juniperi (Leonardi) (fig. 4, B).

1902. *Fiorinia fioriniæ* var. *japonica*, Kuwana, Proc. Calif. Acad. Sci. (3), 3: 79 (part).

Specimens from *Podocarpus chinensis* in Japan were included by Kuwana under *F. fioriniæ* var. *japonica*, but I consider them to belong rather to *F. juniperi*. They agree very closely with specimens of *juniperi* (det. Green) from Ceylon. The species, like *japonica*, is very similar to *fioriniæ*, but differs in having as many as eight large marginal ducts instead of four on the pygidium (fig. 4, B).

Fiorinia chinensis, sp. n. (fig. 4, D, E, F).

From undetermined host from China, taken in quarantine at San Francisco.
Scale not available for description.

Female 0.75 mm. long. Without a process between the bases of the antennae, with no pores about the spiracles and with at the most a very few small gland spines on the margins of the abdominal segments. Pygidium (fig. 4, D), with the median lobes quite large, rounded, minutely serrate, connected at the base and bounding a median notch in which are a pair of small gland spines. Second pair of lobes (fig. 4, E) represented merely by a pair of small tooth-like projections. Between the first and second lobes is the opening of a duct and beyond the second lobe are two more submarginal ducts, all quite small. Circumgenital pores present, forming an almost continuous arch.

Second stage without marginal projections on the abdomen, the pygidium (fig. 4, F) with a deep median notch, the median lobes narrower than in the adult, the second pair represented by a single undivided lobe. Lateral margins of the pygidium with several small gland spines and with five submarginal ducts.

Notes.—This species would appear to belong to Leonardi's genus *Trullifiorinia*, but I am not at present inclined to accept his groups. It somewhat resembles *F. rubrolineata*, Leon., but differs in the larger lobes and submarginal ducts.

Lepidosaphes beckii (Newman).

On *Murraya exotica*, Taihoku, Formosa.

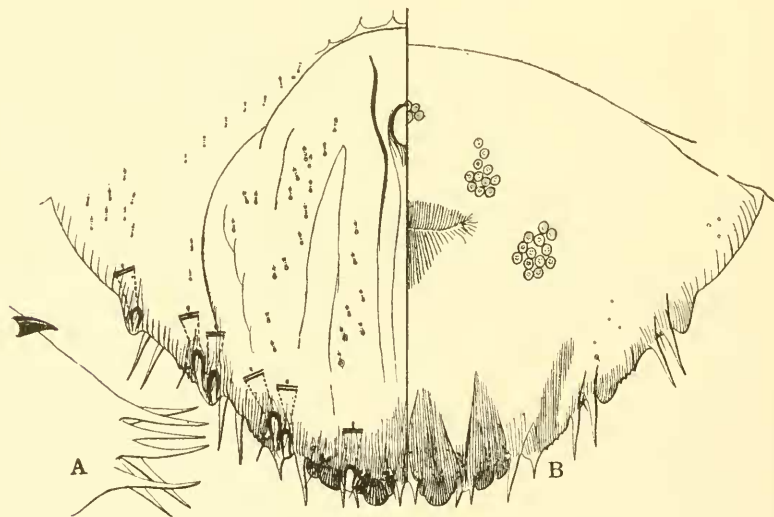


Fig. 5. *Lepidosaphes tubulorum*, sp. n.: A, lateral margin of abdominal segment; B, pygidium.

Lepidosaphes tubulorum, sp. n. (fig. 5).

1902. *Mytilaspis pomorum* (L.); Kuwana, Proc. Calif. Acad. Sci. (3), 3: 80 (part).

Type from *Sapium sebiferum*, Taihoku, Formosa. Also from *Salix warburgi* at the same place, and from *Ilex crenata*, willow and currant in Japan.

Scales of male and female of the type common to the genus, dark brown, the former moderately broad, length 2.75–3 mm.

Female 1.1 mm. long, elongate, rather broad; the derm membranous except for the pygidium; the margins of the last three abdominal segments projecting and bearing numerous gland spines and likewise bearing a small spur-like, chitinised process (fig. 5, A). In some specimens this process may be developed on but part of the segments. Dorsum of the abdomen with large numbers of extremely small ducts.

Pygidium (fig. 5, B) with two pairs of lobes; the median pair widely separated, broad and with a deep subapical notch on each side, the second pair bilobed. Between the median lobes is a pair of small gland spines; between the median and second lobes a pore prominence with two small projections; beyond the second lobes a gland spine, a pore prominence with two large pores, two gland spines, two large marginal pores, two gland spines and two pores. Margins of the marginal pores heavily chitinised. Dorsal ducts extremely minute, arranged in three irregular areas somewhat variable in number. Circumgenital pores in five groups of 6-13 pores.

Notes.—The specimens recorded from Japan were included by Kuwana in *Lepidosaphes ulmi* (= *Mytilaspis pomorum*) along with specimens really referable to that species and others (from orchid) belonging to a species that I shall not here consider because of the scantiness of the material. While *L. tubulorum* is indeed quite similar to *L. ulmi*, it is readily separable by the small size and the arrangement of the dorsal ducts.

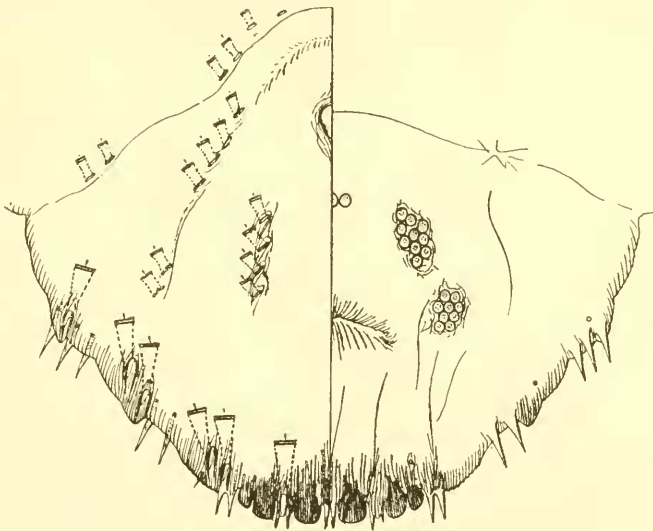


Fig. 6. *Lepidosaphes japonica*, Kuwana: pygidium.

***Lepidosaphes japonica* (Kuwana) (fig. 6).**

1902. *Mytilaspis pomorum* var. *japonica*, Kuwana, Proc. Calif. Acad. Sci. (3), 3: 80.

From *Abies firma*, Japan.

I have at hand the types and type material of this species. It cannot be regarded as having any connection with *L. ulmi*, being in fact a very distinct species. I present the following notes.

Female with the derm unchitinised except for the pygidium. Margins of the abdominal segments projecting, the last three with three or more gland spines, the margins of both thorax and abdomen and the dorsum of the abdomen with numerous moderately large ducts. Pygidium (fig. 6) with two pairs of lobes, the median pair rounded, the second pair bilobed. Between the median lobes are two small gland spines; between the median and second lobes a pore prominence with two projecting points; beyond the second lobes two small gland spines, two large submarginal pores, two gland spines, two pores, three gland spines and a pore. Margins of the marginal pores heavily chitinised. Dorsal ducts only slightly smaller than the marginal ducts, arranged in three rows as indicated in the figure.

Genus *Pygalataspis*, nov.

Diaspidine COCCIDAE referable by the character of the ducts to the *Diaspis* series, that is with the ducts short, relatively broad and with a pair of transverse bars across the inner extremity. Ducts abundant on the pygidium, both dorsally and ventrally, not arranged in rows. Gland spines of the ordinary simple type lacking, being replaced by a series of short, broad, variously toothed plates along the margin of the pygidium, these plates apparently arising in part from the margins of the lobes. Two pairs of lobes or lobe-like processes present, the outer pair not bilobed. Circumgenital pores present in five groups. Scale of both sexes elongate, with the exuviae at one end, that of the female with the dorsal and ventral portions continuous, the ventral scale composed in part of the ventral portion of the second exuviae.

Type of the genus, *Pygalataspis miscanthi*, sp. n.

Notes.—In the abundance and distribution of the ducts and the correlated characters of the scale this genus most closely resembles *Odonaspis*, but the peculiarly shaped plates and the extraordinarily large lobes are quite unlike anything else with which I am familiar. The genus *Odonaspis* is usually attached to the *Aspidiotus* series of the DIASPIDINAE, but I am inclined to doubt the correctness of this placing, regarding it rather as belonging to the *Diaspis* series.

Pygalataspis miscanthi, sp. n. (fig. 7).

From *Miscanthus sinensis* (a grass), Taihoku, Formosa.

Scale of the female about 2.5 mm. long, elongate, white or brownish; scale of the male similar in form and colour to that of the female, about 1 mm. long.

Female (fig. 7, B) elongate, with nearly parallel sides, the margins of the abdominal segments projecting but little or not at all, the derm membranous except for the pygidium and the lateral margins of the last two or three abdominal segments which are heavily chitinised. Lateral margins of the metathorax, and of all the abdominal segments and the dorsum of the last two segments with numerous ducts of the type shown in fig. 7, D.

Pygidium (fig. 7, A) with the marginal area heavily chitinised and more or less folded. Two pairs of large, rounded lobes or lobe-like processes present, each with a broad, flattened, irregularly toothed plate arising from the outer margin, the plates of the second pair larger than those of the median pair. Beyond the second is a cluster of two or three smaller plates. Setae at the bases of the lobes, both dorsally and ventrally, long and slender. Tubular ducts very abundant, all small, those of the venter confined to a broad marginal zone. Circumgenital pores in five groups of 15 or more pores.

Second stage with the pygidium (fig. 7, C) terminating in a pair of prominent, pointed processes, which bear small plates as in the adult, and with a few small plates

along the lateral margin beyond the lobes. Ducts few, relatively large, confined to a submarginal series. Second exuviation occurring by the splitting of the derm about the posterior lateral margin, the ventral portion becoming incorporated in the ventral scale.

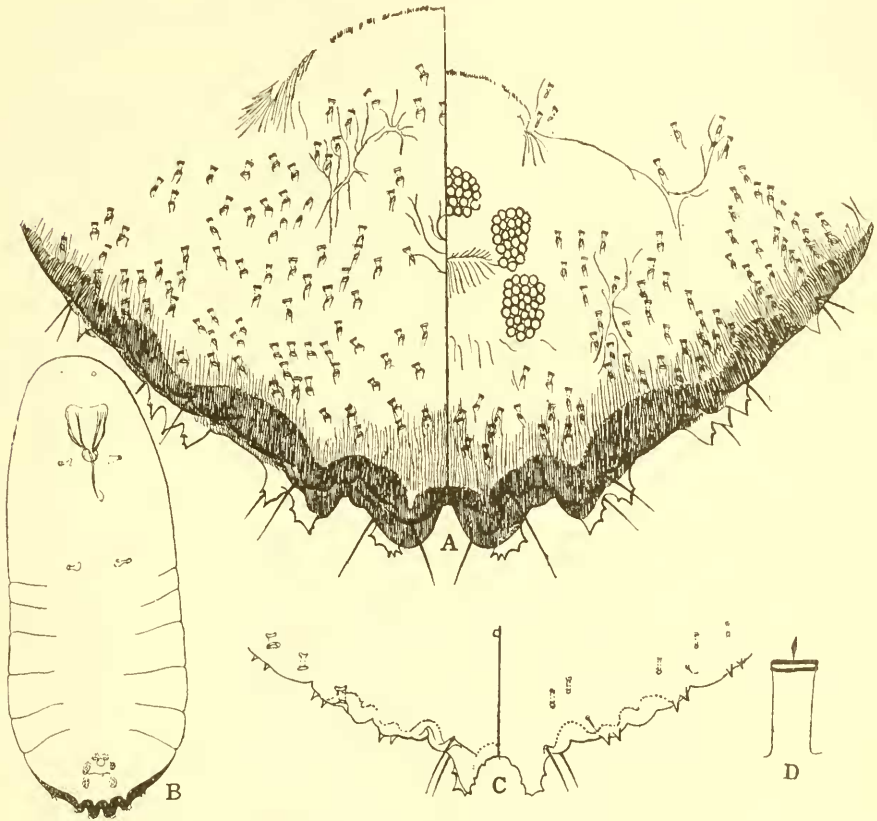


Fig. 7. *Pygalataspis miscanthi*, sp. n.: A, pygidium; B, adult female; C, pygidial margin of second stage; D, type of duct.

***Odonaspis penicillata* (Green).**

1902. *Aspidiotus inusitatus*, Green; Kuwana, Proc. Calif. Acad. Sci. (3), 3: 65 (misidentification).

On *Bambusa stenostachya*, Taihoku, Formosa. Specimens recorded from Japan as *O. inusitata* by Kuwana (ref. cited) are this species instead.

***Aspidiotus lataniae* (Sign.).**

On *Morus alba*, Ako, Formosa, and undetermined host from Formosa in quarantine at San Francisco.

***Chrysomphalus aurantii* (Maskell).**

On *Citrus* sp., Taihoku, Formosa.

Chrysomphalus aonidum (L.).

On *Cycas revoluta*, Ako, Formosa.

Pseudaonidia duplex (Ckll.).

On *Michelia fuscata*, Taihoku, Formosa.

Pseudaonidia trilobitiformis (Green).

On *Citrus* sp., Taihoku, Formosa.
